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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,722	01/16/2002	Joe Perry Cowan	10016654-1	7714

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FORT COLLINS, CO 80527-2400

EXAMINER

MYERS, PAUL R

ART UNIT	PAPER NUMBER
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2112

DATE MAILED: 05/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/050,722	<b>Applicant(s)</b> COWAN, JOE PERRY	
	<b>Examiner</b> Paul R. Myers	<b>Art Unit</b> 2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 January 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7-9 and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Okayama PN 6,128,684.

In regards to claims 1, 7, 9 and 15: Okayama teaches a device (12) comprising: a first interface (4) to first interconnect apparatus (5); a second interface (13) to second interconnect apparatus (10), the second interconnect apparatus of a type capable of connection to peripherals (I/O devices) having direct memory access apparatus (Column 5 lines 16-35) for transferring data; the device capable of serving as a bridge (bridge) for data transfer between the first interface (4) and the second interface (13); and address translation hardware (6-9, 11, 104-108) coupled to translate I/O virtual addresses (logical address) received from the second interface (10) into physical memory addresses (physical address) for transmission onto the first interface (4), the address translation hardware further comprising coherency maintenance apparatus (6).

In regards to claim 2: Okayama teaches coherency maintenance apparatus (6) maintains coherency by observing the first interface for references to entries of a page table in a memory (Column 3 lines 23-43).

In regards to claims 3, 5 and 8: Okayama teaches a valid flag (V) of the address translation hardware is altered when a memory reference having potential to modify a page entry

Art Unit: 2112

table in memory is observed on the first interconnect apparatus in that page table entry in memory corresponds to an address mapping contained within the address translation hardware (Figure 9).

In regards to claims 4 and 14: Okayama teaches the mapping hardware is a translation lookaside buffer (TLB).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okayama PN 6,128,684 in view of Applicants admitted prior art (AAPA).

In regards to claims 6 and 17-18: Okayama teaches coherency maintenance as described above. Okayama does not teach the coherency maintenance using a directory based protocol. AAPA teaches a coherency maintenance apparatus operating through a directory-based protocol (0014) . It would have been obvious to a person of ordinary skill in the art at the time of the invention to use a directory based coherence protocol because this would have assured accesses of data in the system are cleared against the cache directory to ensure that "dirty" data is written to memory and to ensure that prior owning caches are invalidated as needed.

In regards to claim 13: AAPA teaches the use of multiple DMA's (0009).

In regards to claim 16: AAPA teaches that the Snoop is known (0016).

Art Unit: 2112

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okayama PN 6,128,684 in view of Acharya PN 6,459,698.

In regards to claim 10: Okayama teaches the bridge described above. Okayama does not teach the use of a host channel adapter. Acharya teaches a coupling at least one DMA-capable peripheral device through a host channel adapter. It would have been obvious to a person of ordinary skill in the art at the time of the invention to use a host channel adapter because this would have allowed for connection to an infiniband network.

6. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okayama PN 6,128,684 in view of Printz et al PN 2003/0009334.

In regards to claim 11: Okayama teaches an I/O bus but does not teach a host bridge. Printz et al teaches the use of a Host bridge connecting local processors to a system bus (210). It would have been obvious to a person of ordinary skill in the art to include Okayama's bus bridge in a system that has a host bridge because this would have allowed for concurrent processing.

In regards to claim 12: Printz et al teaches: a second processor; a second memory system; a second host bridge, coupling the second processor and the second memory system to the system bus; a second address translation apparatus, coupled to translate an I/O virtual address originating with the at least one DMA-capable peripheral device into a second physical memory address, including cache coherency.

***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul R. Myers whose telephone number is 703 305 9656. The examiner can normally be reached on Mon-Thur 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 703 305 4815. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



PRM  
May 7, 2004

PAUL R. MYERS  
PRIMARY EXAMINER